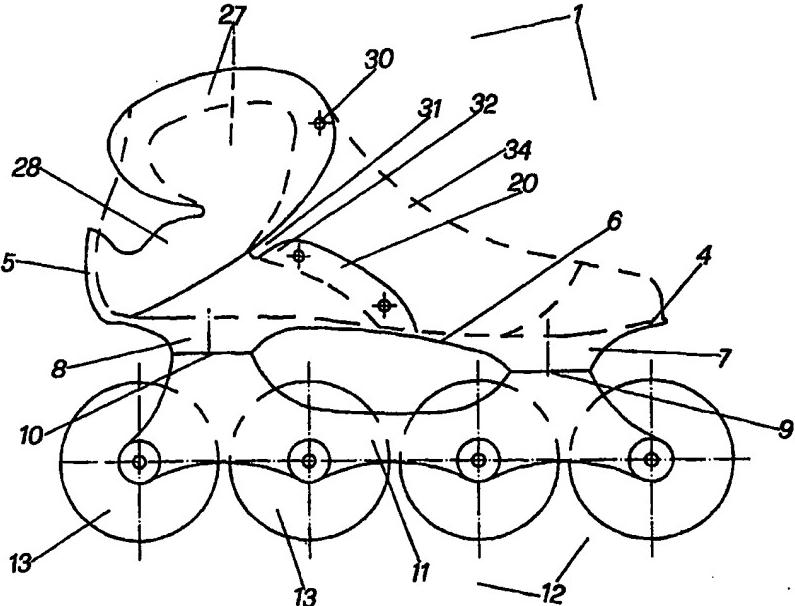


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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: SPORT WEARABLE STRUCTURE, IN PARTICULAR FOR IN-LINE AND SHORT-TRACKING ROLLER SKATES			
			
(57) Abstract			
Footwearable structure (1) with shell and shaft (2, 29) made up of a plurality of components (19, 20, 27, 28, 43) and alveolar elements (35, 40, 41 and 45) from restraints of a specific shoe (34) or of one that may be applied to other uses, when disengaged from said sports structure, in particular for in-line and short-tracking roller skates.			

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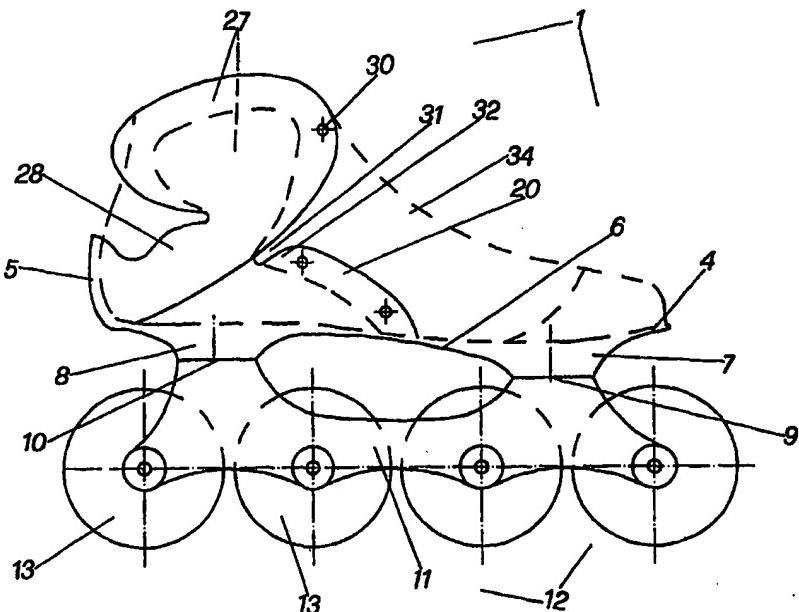


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(54) Title: SPORT WEARABLE STRUCTURE, IN PARTICULAR FOR IN-LINE AND SHORT-TRACKING ROLLER SKATES



(57) Abstract

Footwearable structure (1) with shell and shaft (2, 29) made up of a plurality of components (19, 20, 27, 28, 43) and alveolar elements (35, 40, 41 and 45) from restraints of a specific shoe (34) or of one that may be applied to other uses, when disengaged from said sports structure, in particular for in-line and short-tracking roller skates.

SPORT WEARABLE STRUCTURE, IN PARTICULAR FOR IN-LINE AND
SHORT-TRACKING ROLLER SKATES

DESCRIPTION

The invention relates to a sport footwearable structure, a footwearable-skate structure assembly, in particular for in-line and short-tracking roller skates.

Hereinafter, the term in-line roller skates refers to a well-known sport means, having a plurality of wheels associated longitudinally with a rigid support, with specific shoes and used in various disciplines, normally performed by skaters on skating rinks with complex manoeuvres, such as frontflips, backflips, liukang or kungloo turns, in backside or in backslide, on boardwalks up to the fishbrains or other manoeuvres, in addition to speed competitions, and said short-tracking, as they are currently known in the specific field.

As is well known in the present state of the art, the operating effectiveness of in-line or side-by-side roller skates is dependent more on the conditions of the surfaces skated upon than on the mechanical properties of the skates themselves, which have been consolidated through considerable expansions of said sport activities. Said conditions, while normal on covered rinks, are practically nonexistent on external rinks or on road surfaces, where a slight unevenness or a small foreign body is sufficient to jeopardize manoeuvres and movements and/or cause serious, and sometimes dangerous falls, particularly in specialties like said short-tracking.

The vibrations and their resonance occurring on such skates and on rigid footwear, caused by unbalanced wheels or due to rolled asphalt-conglomerate surfaces, are such as to determine serious damage on said means, on associated rolling units and/or their mechanical parts; with as many other established negative effects caused by abruptly slowed-down dynamic phases and/or interrupted manoeuvring procedures of a skater; with consequent intense numbing in tarsal and metatarsal regions of the feet, muscular cramps and dizziness due to limited vasal blood supply.

To overcome said disadvantages, various manufacturers have proposed in-line roller skates with interposed rubber pads for supporting rigid footwear on equally stiff flat foot arch supports, which, though they may be effective for normal amateur activities, are able to cause problems to expert skaters that are as serious as the above-mentioned disadvantages.

In fact, both in training and in serious competition on rinks in said manoeuvres, an athlete is subjected to severe alternating stresses due to forces generated by vibrations and loads bearing on such rigid structures and transmitted integrally from the lower limbs to the backbone and the head, with negative effects on the functionality of corresponding vital organs and systems.

Moreover, said rigid footwear designed for normal skates, worn with interposed closed-cell "indoor light shoes", although ventilated by recurrent cavities, are not capable of allowing a sufficient and effective breathability of shod feet and covered shin parts.

As much can also be said for the well-known present speed-competition shoes, made "to measure", normally using plaster casts of a skater's feet, with imprints enlarged with padded intermediate materials in order to achieve, in subsequent phases, "made-to-measure insides" of foam plastomers between such moulds, with obvious involved processes and considerable production costs, leaving the aforesaid disadvantages unresolved.

In fact, unfavourable conditions emerged in these formations after being used a few times, due to: impermeable make-ups prejudicial to the proper transpiration of liquid and volatile humours secreted by the sweat glands of covered limbs, activated by the vagal section of the neurovegetative system; the occurrence of putrid fermentation due to significant sweat retentions; epithelial

remnants, from maceration, containing considerable quantities of staphylococci and streptococci; hyperperspiration such as to compromise said dynamic and specific usage properties. These properties are necessary most of all for procedures and phases both in short-tracking practice and competitions, in such acrobatic tricks, in the so-called aerials, mistyflips or halfpipes, to which can be ascribed the greatest energy and heat outputs generated in said dynamics, encountered by both amateur athletes and expert skaters.

The fundamental purpose of this invention is to solve the above-mentioned technical problems, avoiding drawbacks and/or disadvantages, in any way they may be blamed as their causes or effects.

The results achieved with this wearable structure, resulting from methods according to this invention, ensue from: accurate control of the angles of incidence of the roller skates on the surfaces impinged upon, radial inclinations suitable for balancing the centre of gravity of a skater, especially in short-tracking; constant mutual contacts between the foot and this wearable structure, for changes of position and directional shifts corresponding to their movements; interconnections conforming to balanced pressures on tarsal and metatarsal parts, and on malleolar, tendinous and contiguous regions of a shod foot; insulation, obtained from internal alveolar formations, determining an efficient damping of the effects of vibrations originating from rolling units in severe operation, generated from alternated dynamic actions of said units, and transduced by individual sources of gravity of a skater misaligned with respect to the centre of symmetry of this structure; reduction of frequencies and amplitudes of said vibrations, such as to prevent the generation of resonances due to periodic coincidences of alternating forces and/or to oscillations induced in said assembly by the conditions and stresses to which it is subjected; related effects, made ineffectual on dynamics, particularly in short-tracking, during racing phases and procedures; with a wearable structure with ventilated inside both in the shaft and in the shell made up of open and alveolar areas such as to favour effective inflows of air from outside and corresponding outflows of excreted perspiration, appreciably limiting hyperhidrosis and hindering spasms of the cutaneous blood vessels and congestions of covered body parts due to interrupted excretions and vasal blood flows; precluding stagnations, the formation of moulds, proliferations of bacteria and associated consequences.

The advantages obtained with this wearable structure, realized in accordance with this invention, consist substantially in that: constant and effective interactions are achieved in every procedure of the above-mentioned short-tracking speed activities, developed to safeguard the limbs, systems and vital organs of an athlete, as well as the components of said assembly; to which is temporarily associated a conventional sport shoe, preferably light and designed to be put to other uses when disengaged, such as to walk to starting spots, enter or remain in living or other quarters, used as normal leisure, trekking or similar footwear, or worn by an athlete, whether the athlete be a skater or otherwise, especially for uninterrupted periods.

With the benefits derivable from this wearable structure, made of suitable filled plastomers, preferably filled with carbon fibres, which, suitably formed, can be used in other related activities, such as ice skating, in the so-called cross-country mountain skates, for skates with side-by-side wheels and/or for different uses, including cross-country and alpine skiing, and for the so-called ski-rolls for road surfaces and/or for other sport activities.

Additional characteristics, advantages and functions of the invention will become evident hereinafter from detailed descriptions of examples, in themselves not binding and/or restrictive, of preferential practical embodiments of a wearable structure, normally for in-line and short-tracking roller skates, in accordance with this invention, illustrated by the following drawings, in which:

- Fig. 1 is a side view of said wearable structure, showing the sole with tangible projections, partially in cross section, designed to be associated with skates, normally in-line roller skates or ice skates;
- Fig. 2 is a view from above of the structure of Fig. 1 with said external prominences noticeably offset with respect to the longitudinal axis of the arch support;
- Fig. 3 is a side view of an assembly consisting of a skate and a wearable structure, as in Figures 1 and 2, resulting from a practical industrial embodiment;

- Fig. 4 illustrates said structure, with an associated rigid toe, integratable with a shoe, preferably a sport shoe designed for different uses when it is disengaged from this formation;

- Fig. 5 is a cross-sectional view of said rigid toe taken along line A-A' of Fig. 4, showing an alveolar intermediate material incorporated therein;

- Fig. 6 is a cross section along line B-B' of Fig. 1 of the structure shown in Figures 1, 2 and 4, showing said intermediate element of foam plastic elastomers;

- Fig. 7 is a top view of a protective element for malleolar, tendinous and contiguous regions of a shod foot, obtained from pads of said materials and with a plurality of heat-pressed alveolar sectors;

- Fig. 8 is a cutaway view of said cut element taken along line C-C' of Fig. 7.

In accordance with the invention, these figures represent a footwearable structure, particularly for in-line or short-tracking skates, comprising a shell with raised shaft, with a sole between the toe and the spur, characterized by the presence in said sole of a plurality of asymmetrical flaps having their front ends in the vicinity of said toe, with their opposite ends integrated with a sector wound around said spur, and in correlation with opposed elements, forming said shaft, corresponding to malleolar regions and contiguous parts of a shod foot bearing on said sole with an external contour noticeably recessed between projections suitable for a skate, for which this wearable structure is designed.

In other words, Figures 1 to 8 represent a practical embodiment of this wearable structure, generally indicated by 1, which involves:

- a shell 2 on a sole 3, with a tip 4 and a spur 5, with a semi-elliptical external contour 6 between tangible projections 7,8 to which are associated the bases 9,10, with relative connectors, in a support 11 of a skate 12 with a series of wheels 13 longitudinally aligned with said support (see Figures 1 to 3);

- an internal arch support 14 of the sole 3, with a plurality of gradual opposed appreciable projections 15, with a stiffening function for the sole, between downwardly extending recesses 16 adapted for heads 17 of multiple

connectors 18, offset with respect to the longitudinal axis of said wearable structure 1 (see Fig. 2);

- a plurality of opposed asymmetrical flaps 19,20, corresponding to tarsal and metatarsal regions of a shod foot (see Figures 1 to 4);

- an end 21 of the flap 19, in the vicinity of the front side 22 of said projection 7 contiguous to the tip 4 (see Figures 1 to 4);

- an end 23 of the opposed flap 20 tangibly lowered in the direction of the opposite side 24 of said projection 7 (see Figures 1 to 4);

- end regions 25, opposite to the ends 21,23 of the flaps 19,20, normally forming a sector 26 wound around said spur 5 (see Fig. 2);

- a plurality of opposed elements 27, preferably of elliptical form, with discordant focuses and on inclined elongate elements 28, constituting a shaft, generally indicated with numeral 29, similarly structured with said terminals 25 and, as with the flaps 19,20, with a perforation 30 for known adjustable straps, for temporary restraints of the means worn in this structure 1, not shown for brevity;

- a hollow zone 31, between said elongate elements 28 and end sectors 32 of the flaps 19,20 of which at least one is tangibly foldable on the front contour 33 of a temporarily associated specific shoe 34, indicated by dashed lines (see Figures 1 and 3).

Said footwearable structure 1, especially when designed for short-tracking, involves a structure 1, normally made of plastomers filled with carbon or Kevlar fibres, with an integrated element 35, cut from sheets of thermoformable foam elastomer plastics, which presents:

- a body 36 with configurations correlated with said elliptical elements 27, with the elongate elements 28, with an intermediate region destined for said spur 5 and the sectors that make up said flaps 19,20 and respectively indicated with 37, 38 and 39 (see Fig. 7);

- a plurality of ridges 40 contiguous to furrows 41, obtained by means of hot-cold thermoforming, with geometrical parameters and values proportionate with the aforementioned vibration insulation in said assembly and to the discharge of perspiration excreted by a shod foot (see Figures 7 and 8);

- a region 42 with configurations, in reciprocal relationship with the malleolar regions of said limb, thermoformed with said ridges and furrows 40,41, which in the example are offset with respect to the axis of symmetry of the elements 27 (see Fig. 7).

This footwearable structure 1, especially when intended for said skating practices other than short-tracking, is provided with:

- a rigid toe 43, preferably associated, made of filled plastomers, and adapted for accommodating and retaining a toe of a sport shoe with extensive woven areas allowing breathing, e.g., Gore-Tex, which can be applied to other uses when disengaged from said structure 1;
- an associated cut element 35, with said parts 37 to 39 and respective ridges and alveoli (see Fig. 5);
- an internal space 44 of the toe 43, with a foam intermediate element 45 with said elements 40,41 thermoformed with configurations adapted to the toe of a shoe, preferably light and sporty (see Fig. 6);
- a tangible front hollow area 46 intended to provide inflows from outside and outflows from inside said toe 43.

The invention involves additional embodiments of said footwearable structure 1, according to the expressed functional characteristics, obtained by modifying the described material characteristics, without departing from the scope of the present patent.

Among the most evident modifications, in addition to the one exemplified by Figure 4, can be obtained the ones corresponding to embodiments and/or uses of:

- a toe 43 with a monostructure, that is associated on temporary positions with the tip 4 of said wearable structure, in accordance with the dimensions of an integratable preferential shoe;
- an open area, normally intermediate in said sector 26 enfolding the spur 5, intended for temporary interspaces between associated end restraints, according to the posterior dimensions of a shoe and of the means worn and/or the defined outflows of aforementioned transpirations;
- said elements 27 temporarily arranged and retained on elongate elements 28 and in positions corresponding to malleolar regions of a shod foot;
- a stiffener, with said sectors 40,41 associated with the spur 5 and with dorsal parts of said elements 27 making up the shaft 29, with configurations correlated with said components 5, 27 and 29.

Likewise, said wearable structure 1 is feasible with a plurality of components, such as: a sole 3 with said flaps 19,20 and integrated in an assembly, formed by a shaft 29, with elongate elements 28 with a spur 5 and toe

43, pivoted on said projection 7 and retained on the back one 8, with interposed temporary sectors, which correspond to preferential angles of inclination of a skater, especially for short-tracking on in-line roller skates and/or ice skates.

Additional obvious modifications may result from embodiments of a wearable structure-skate assembly, in particular one intended for application in different sport activities, with ice skates, in-line roller skates, or other above-mentioned disciplines.

From the practical embodiments described above, according to the invention, the illustrated wearable structures distinguish themselves from the present state of the art, cited in the preamble, in clearly overcoming the problems disclosed and in achieving the objectives and predetermined purposes.

In each case, any constructive component exemplified, described and illustrated, necessary for the purposes, can be replaced with other technically equivalent means and/or components.

Similarly, in the tests and in practical embodiments, according to the proposed embodiments and applications, the materials used, and the forms and dimensions are the most suitable and chosen according to the specified requirements.

CLAIMS

1. - Sport wearable structure, in particular for in-line and short-tracking roller skates, including a shell (2) with raised shaft and with a sole (3) between the tip and the spur (4 and 5), characterized in that it is provided with said sole (3) having a plurality of asymmetrical flaps (19,20) with their front ends (21,23) in the vicinity of said toe (4), with opposed ends (25) integrated with a sector (26), enfolding said spur (5), and in correspondence with opposed elements (27), forming said shaft (29), corresponding to malleolar regions and to contiguous parts of a shod foot bearing on said sole (3) involving an external contour (6) tangibly recessed between projections (7,8) suitable for a skate, for which this footwearable structure is designed (1).

2. - Structure, as claimed in Claim 1, characterized in that it is provided by said semi elliptical external contour (6), between said tangible projections (7,8) which correspond to bases (9,10) in a support (11) of a skate (12) consisting of a plurality of wheels (13) longitudinally aligned with the axis of said sport means (12), retained by connectors (18).

3. - Structure as claimed in Claims 1 and 2, characterized in that said sole (3) includes an internal arch support (14) having a plurality of gradual opposed appreciable projections (15), between downwardly extending recesses (16) corresponding to heads (17) of said multiple connectors (18), which are normally offset with respect to the longitudinal axis of said footwearable structure (1).

4. - Structure as claimed in Claims 1 and 3, characterized in that it includes a plurality of opposed flaps (19,20), preferably asymmetrical, adapted for tarsal and metatarsal regions of a shod foot.

5. - Structure as claimed in Claims 1 and 4, characterized in having said flap (19) with an end (21) in the vicinity of the side (22) of said projection (7), contiguous to the tip (4) of said sole (3).

6. - Structure as claimed in Claims 1 and 5, characterized in having a lowered flap (20), opposite said flap (19), with an end (23) in the direction of the opposite side (24) of said projection (7).

7. - Structure as claimed in Claims 1 and 6, characterized in having terminal regions (25), opposed to said ends of the flaps (19,20), concurring in forming a sector (26), enfolding said spur (5).

8. - Structure as claimed in Claims 1 and 7, characterized in having a plurality of opposed elements (27), normally with elliptical configurations, with discordant focuses and on inclined elongate elements (28), constituting said shaft (29), and similarly structured with said terminal parts (25) opposed to said ends (21,23) of the flaps (19,20).

9. - Structure as claimed in Claims 1 and 8, characterized in having, in said flaps (19,20) and ellipsoidal elements (27), a plurality of perforations (30) suitable for temporary fastening means winding around what is arranged in said footwearable structure (1).

10. - Structure as claimed in Claims 1 and 9, characterized in having a tangible hollow zone (31), between said elongate elements (28) and end portions (32) of said asymmetrical flaps (19,20).

11. - Structure as claimed in Claims 1 and 10, characterized in having at least one of said flaps (19,20) tangibly extended and foldable on the front contour (33) of a specific shoe (34) temporarily associated with this footwearable structure (1).

12. - Structure as claimed in Claims 1 and 11, characterized in that, especially when intended for the short-tracking discipline, it is made of plastomers filled with carbon or Kevlar fibres, with an integrated element (35) cut from coupled sheets of thermoformable foam plastoelastomers.

13. - Structure as claimed in Claims 1 and 12, characterized in having said element (35) as an integral part (36) with elements (37,38 and 39) with configurations correlated with said elements (27), with elongate elements (28), with an intermediate region (26) intended for said spur (5) and with sectors making up said asymmetrical flaps (19,20).

14. - Structure as claimed in Claims 1 and 13, characterized in that said element (35) is provided with a plurality of ridges (40) adjacent to furrows (41), produced by hot-cold thermoforming and with geometrical parameters suitable for vibration insulation in said configuration (1) and for the discharge of perspiration excreted therein by shod feet.

15. - Structure as claimed in Claims 1 and 14, characterized in having said elements (27) with parts (42) with configurations, in reciprocal relationships with malleolar regions of a foot, thermoformed with said alveoli (41) between ridges (40) and, normally, offset with respect to the axis of symmetry of said preferably elliptical elements (27).

16. - Structure as claimed in Claims 1 and 15, characterized, especially if designed for skating disciplines other than short-tracking, in being provided with an associated rigid toe (43) made of plastomers, preferably filled, with an inside suitable for the toe of a shoe, with regions of transpiring fabrics, such as

Gore-Tex, that can be applied to other uses when disengage from this structure (1).

17. - Structure as claimed in Claims 1 and 16, characterized in having said associated toe (43) integrated with a cut element (35) provided with parts (37 and 39) having a plurality of ridges and alveoli (40,41).

18. - Structure as claimed in Claims 1 and 17, characterized in having said toe (43) with an internal space (44) having an intermediate foam element (45) with said sectors (40,41) having configurations suitable for the toe of a shoe, normally of sport type and held temporarily in this structure (1).

19. - Structure as claimed in Claims 1 and 18, characterized in that said toe (43) is provided with a tangible front hollow space (46) suitable for inflows from outside and for outflows from inside said internal space (44).

20. - Structure as claimed in one or more of Claims 1 to 19, characterized in having a monostructure toe (43), associated with the tip (4) of this footwearable formation (1), on temporary positions defined by the dimensions of an integratable shoe.

21. - Structure as claimed in one or more of Claims 1 to 20, characterized in that said sector (26), enfolding the spur (5), has an open area, preferably intermediate, intended for temporary interspaces between respective end fasteners, which are defined by the posterior dimensions of a shoe and of the foot.

22. - Structure as claimed in one or more of Claims 1 to 21, characterized in having said opposed elements (27) temporarily arranged and connected to said elongate elements (28), on positions defined by zones corresponding to malleolar and contiguous regions of the shod foot.

23. - Structure as claimed in one or more of Claims 1 to 22, characterized in having a stiffener with sectors (40,41) which is designed for the spur (5), with the dorsal parts of said elements (27) making up said shaft (29), and with configurations in reciprocal relationships with these components (5,27 and 29).

24. - Structure as claimed in one or more of Claims 1 to 22, characterized in having a sole (3) with flaps (19,20) integrated in an assembly, consisting of a shaft (29) with elongate elements (28) and a spur (5) and with a toe (43), pivoted in the front projection (7) and connected to the back projection (8) with interposed temporary sectors defining preferential inclinations of a skater, specifically in short-tracking speed activities and procedures and with in-line roller skates or ice skates with specific blades on corresponding supports.

25. - Footwearable structure-skate assembly as claimed in one or more of Claims 1 to 24, characterized in having said components (1 to 46) designed for use in activities with in-line roller skates or ice skates, roller skates with side-by-side wheels and/or other and different activities with sport equipment for snow, road and cross-country activities.

26. - Wearable sport structure as claimed in one or more of Claims 1 to 25, in particular for in-line and short-tracking roller skates, characterized in the embodiment as herein described and illustrated.

27. - Footwearable structure-skate assembly as claimed in one or more of Claims 1 to 25, characterized in being embodied as herein described and illustrated.

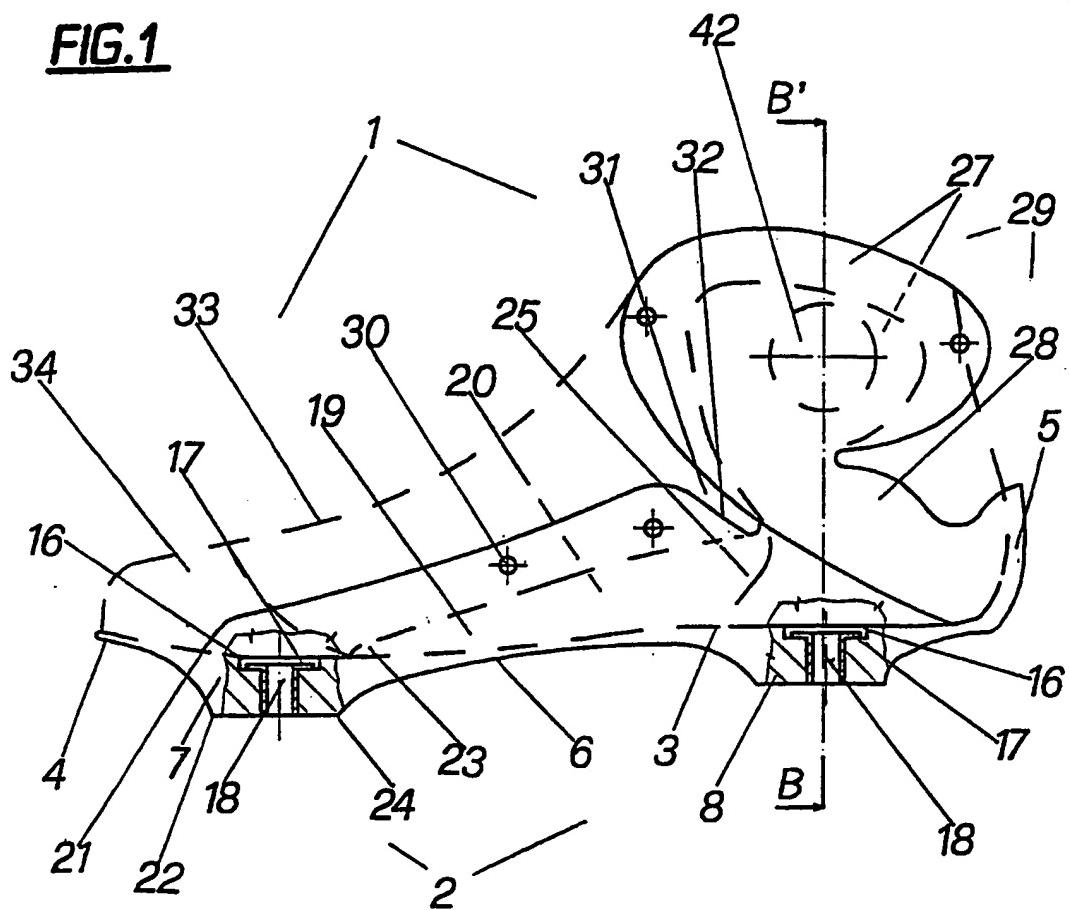
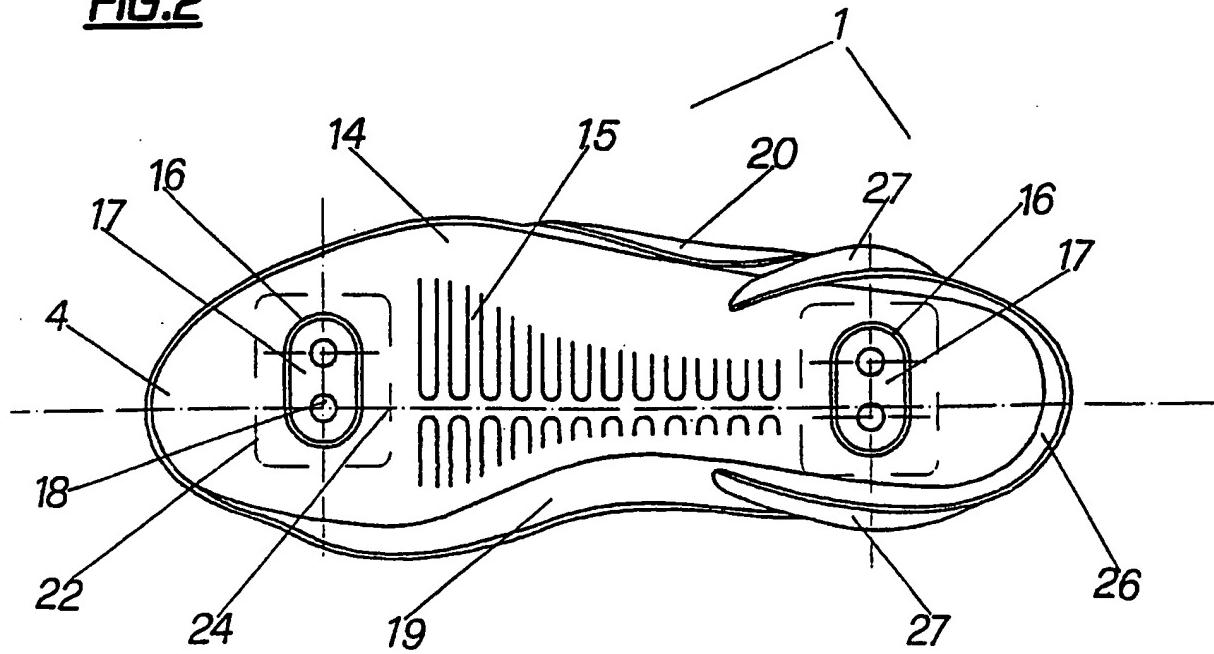
FIG.1FIG.2

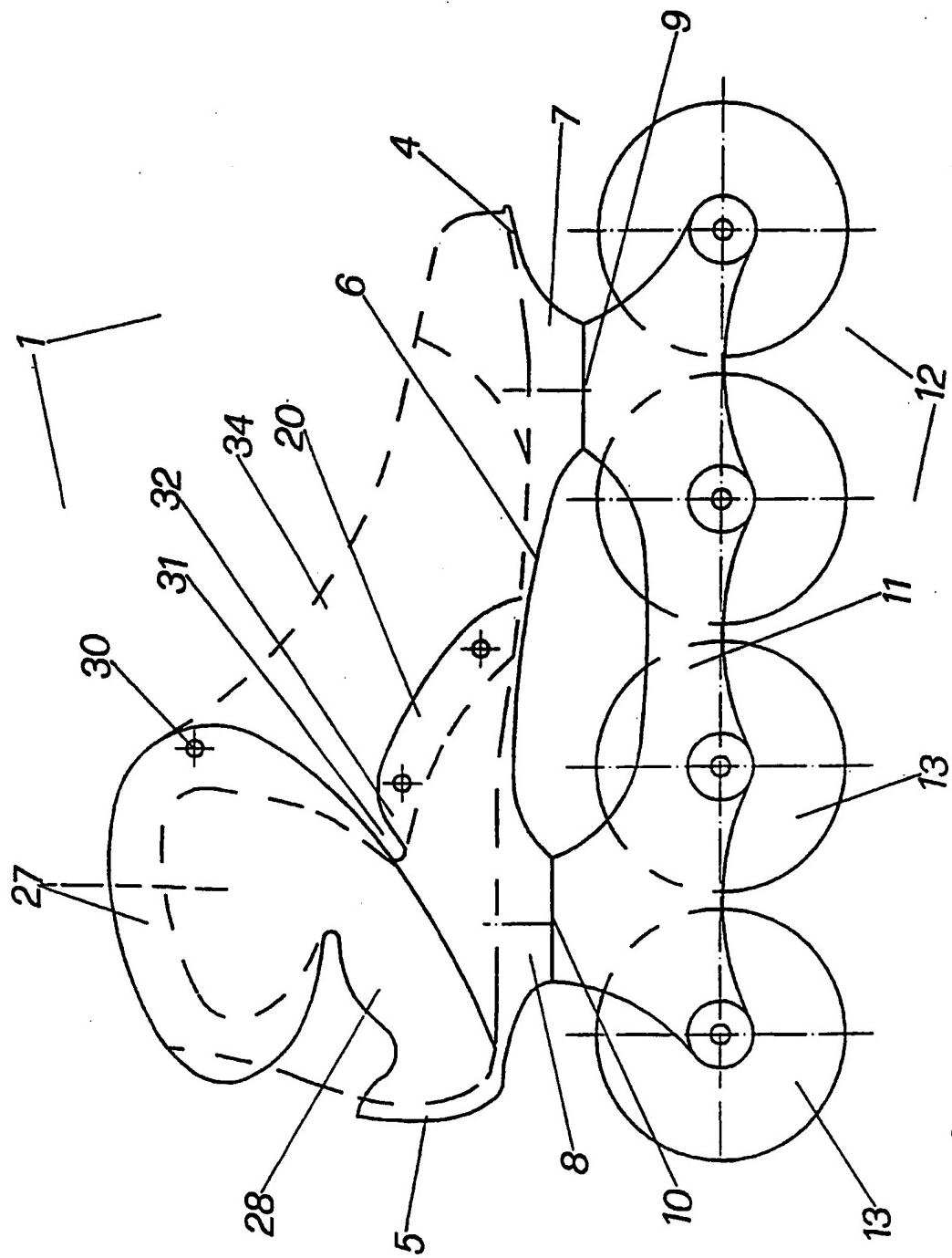
FIG.3

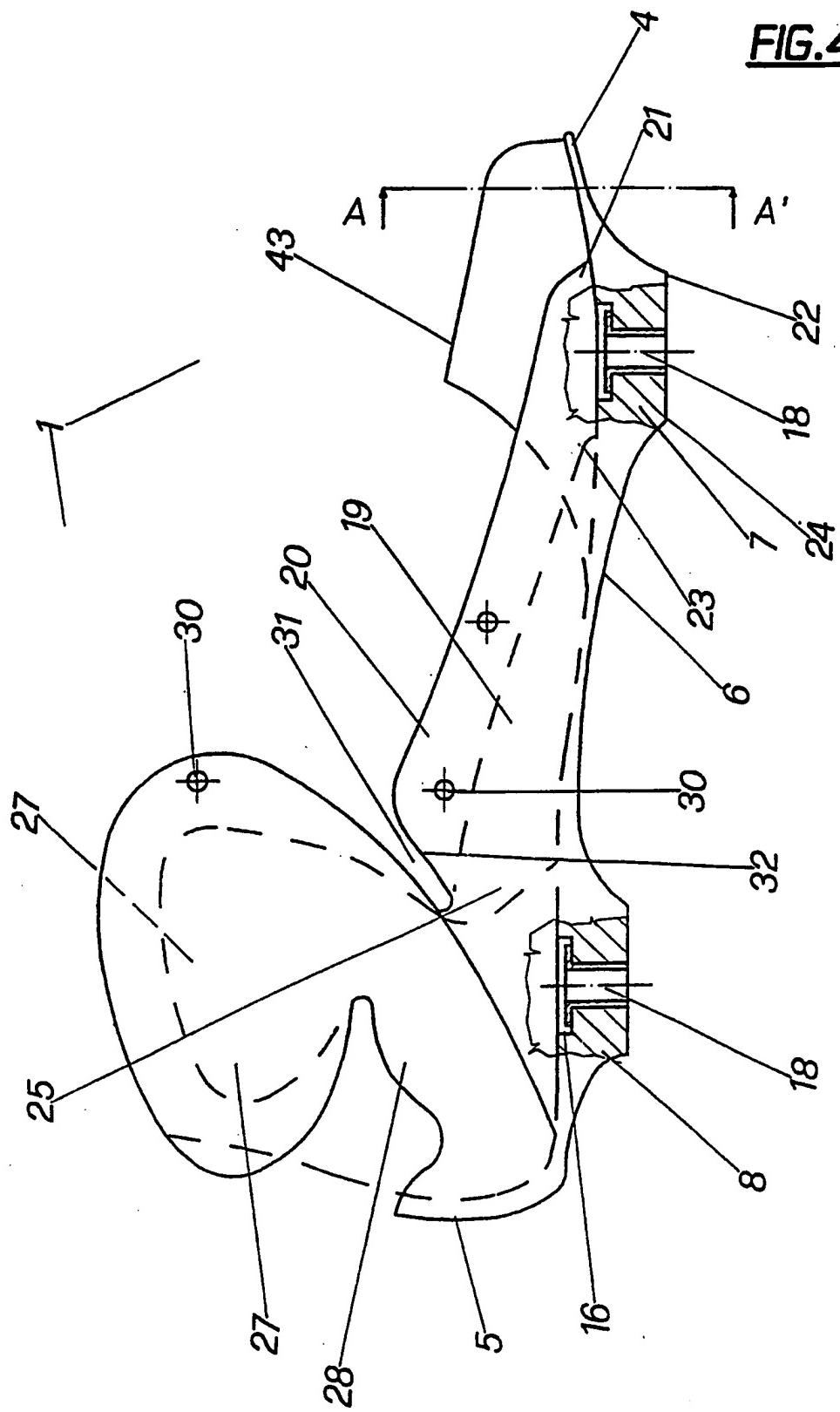
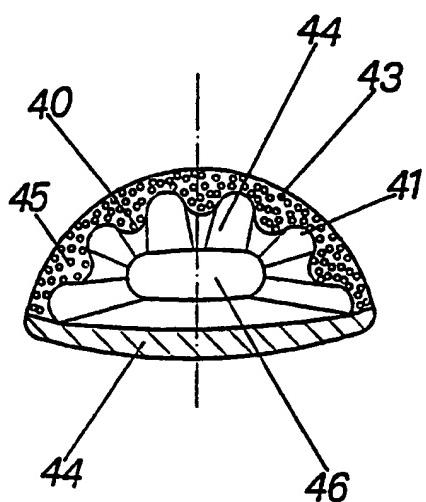
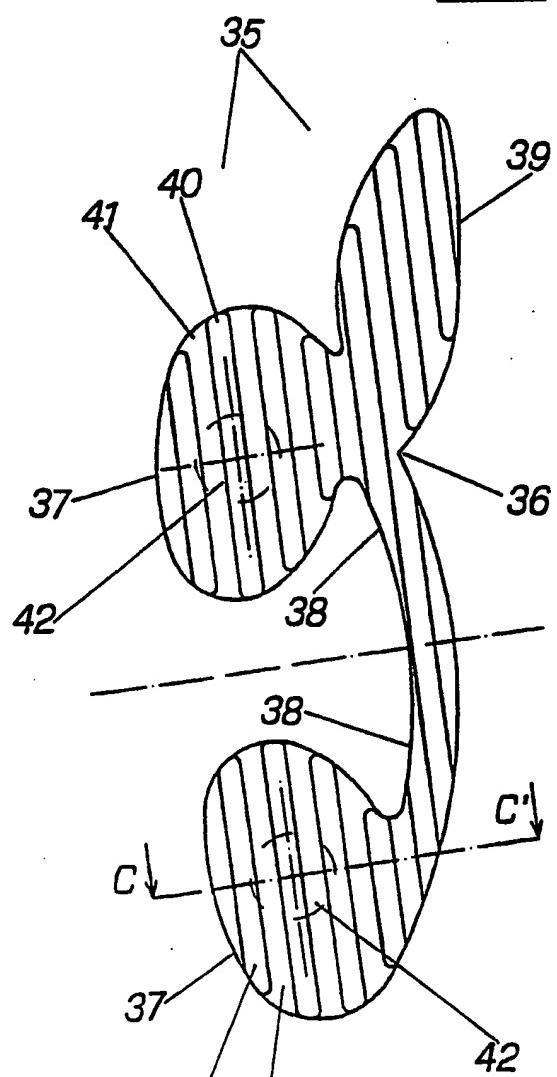
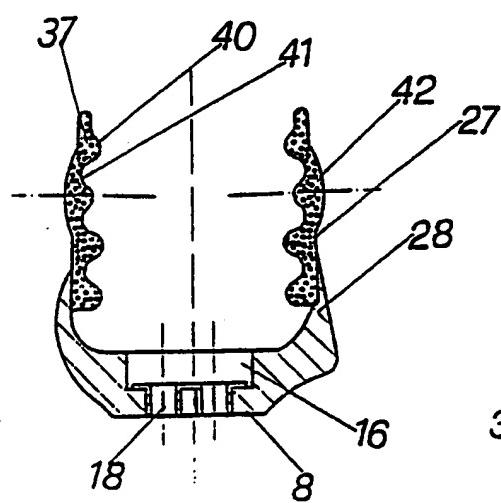
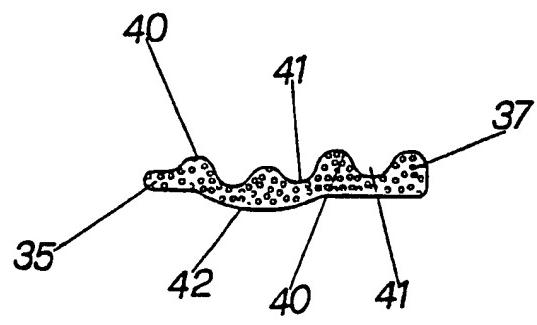
FIG.4

FIG.5FIG.7FIG.6FIG.8

INTERNATIONAL SEARCH REPORT

Inte
onal Application No
PCT/EP 98/03902

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A43B5/16

According to International Patent Classification(IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A43B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 765 614 A (NORDICA) 2 April 1997 see the whole document ---	1
A	US 5 357 695 A (JINNY LU) 25 October 1994 see the whole document ---	1
A	EP 0 551 704 A (ROLLERBLADE) 21 July 1993 see the whole document ---	1
A	WO 95 15094 A (CANSTAR SPOTRS) 8 June 1995 see the whole document ---	1
A	EP 0 679 346 A (NORDICA) 2 November 1995 see the whole document ---	1
A	EP 0 117 372 A (WARRINGTON) 5 September 1984 see the whole document ---	1
	-/-	

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

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Date of the actual completion of the international search	Date of mailing of the international search report
14 October 1998	23/10/1998
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Declerck, J

INTERNATIONAL SEARCH REPORT

Inte onal Application No
PCT/EP 98/03902

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR 2 668 072 A (VULLIERME INT.) 24 April 1992 see the whole document -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 98/03902

Patent document cited in search report	Publication date	Patent family member(s)			Publication date
EP 0765614 A	02-04-1997	IT	1279444 B		10-12-1997
		CA	2185980 A		23-03-1997
		US	5768807 A		23-06-1998
US 5357695 A	25-10-1994	NONE			
EP 0551704 A	21-07-1993	US	5331752 A		26-07-1994
		CA	2071806 A		15-07-1993
		JP	5220254 A		31-08-1993
WO 9515094 A	08-06-1995	CA	2110328 A		31-05-1995
		AU	1061595 A		19-06-1995
		EP	0804102 A		05-11-1997
EP 0679346 A	02-11-1995	IT	TV940041 A		26-10-1995
		CA	2147954 A		27-10-1995
		US	5596820 A		28-01-1997
EP 0117372 A	05-09-1984	US	4509276 A		09-04-1985
		CA	1192395 A		27-08-1985
		DE	3375363 A		25-02-1988
		DK	608683 A		29-07-1984
		FI	832988 A		29-07-1984
		JP	59144402 A		18-08-1984
FR 2668072 A	24-04-1992	NONE			